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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/768,950	01/24/2001	Robert W. Hower	UOM0217PUS	4268

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EXAMINER	
NOGUEROLA, ALEXANDER STEPHAN	
ART UNIT	PAPER NUMBER
1753	6

DATE MAILED: 02/12/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/768,950	HOWER ET AL.	
	Examiner	Art Unit	
	ALEX NOGUEROLA	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 June 2001 and 06 February 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-38* is/are pending in the application.

4a) Of the above claim(s) *27-37* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11, 17- 22, 24-26, 38* is/are rejected.

7)☒ Claim(s) *12- 16* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 January 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *2,4* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Specification

1. The abstract should be 150 words or less. MPEP 608.01(b).

Election/Restrictions

2. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-26 and 38, drawn to a sensor and a method making the sensor, classified in class 204, subclass 403.01.

II. Claims 27-37, drawn to a method of using a micromachined device, classified in class 436, subclass 174.

3. "Where an application contains claims to a product, claims to a process specially adapted for (i.e., not patentably distinct from, as defined in MPEP § 806.05(f)) making the product, and claims to a process of using the product, and the product claims are not allowable (i.e., not novel and nonobvious), restriction is proper between the process of making and the process of using. In this instance, applicant may be required to elect either (A) the product and process of making it; or (B) the process of using. Unless the examiner can make a showing of distinctness between the process of using and the product (MPEP § 806.05(h)), the product must also be joined with the process of using in grouping (B)." MPEP 806.05(i).

4. All of the product claims have been rejected or objected to.

5. The invention of claims 1-23 and the invention of claims 27-37 are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product (MPEP § 806.05(h)). In the instant case the product can be used as sensor without a membrane (see Gau (WO 01/83674 A1); claims 1-23 do not require a membrane and claims 27-37 do not require using the micromachined device for sensing.

6. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

7. During a telephone conversation with David Syrowik on February 06, 2003 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-26 and 38. Affirmation of this election must be made by applicant in replying to this Office action.
Claims 27-37 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

8. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 112

9. Claims 8 and 38 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention:

a) Claim 8 requires that the microsensor (device) be a gas sensor, however, Claim 3 requires that the wells be capable of receiving and retaining a known quantity of liquid, presumably sample. This appears to be inconsistent; and

b) Claim 38: is an organic electronic device made with only natural ingredients?

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

11. Claims 1-7, 11, 17-19, 21, 22, 24-26, and 38 are rejected under 35 U.S.C. 102(e) as being anticipated by Gau (WO 01/83674 A1).

Addressing Claim 1, Gau teaches a micromachined device for receiving and retaining a liquid droplet at a desired site (the abstract), the device comprising

a substrate having an upper surface (substrate, not labeled, upon which the electrodes are located shown in Figures 2, 7(b), 12, and 13, on pages 36, 38, 8/19, and 8/19, respectively); and

a three-dimensional, thin film well patterned at the upper surface of the substrate wherein the well is capable of receiving and retaining a known quantity of liquid at the desired site through surface tension (a well is shown in Figures 2, 7(b), 12, and 13, on pages 36, 38, 8/19, and 8/19, respectively. Note that the electrodes also act as wells. That the wells are capable of retaining a known quantity of liquid at the desired site through surface tension is implied by page 10, lines 24-34, which teaches that the area surrounding the wells and electrodes is hydrophobic so as to contain the liquid. Also see page 14, lines 3-5, which teaches using surface

tension to confine liquid, and page 15, lines 27-32, which teaches that the hydrophobic substrate surface will confine liquid administered by pipette.)

Addressing Claim 2, Gau teaches a micromachined device for receiving and retaining at least one liquid droplet at a desired site (the abstract), the device comprising

a substrate having an upper surface (substrate, not labeled, upon which the electrodes are located shown in Figures 2, 7(b), 12, and 13, on pages 36, 38, 8/19, and 8/19, respectively);

a first three-dimensional, thin film well patterned at the upper surface of the substrate wherein the first well is capable of receiving and retaining a first known quantity of liquid at the desired site through surface tension (a well is shown in Figures 2, 7(b), 12, and 13, on pages 36, 38, 8/19, and 8/19, respectively. Note that the inner electrode of the concentric electrodes also act as a well. That the wells are capable of retaining a known quantity of liquid at the desired site through surface tension is implied by page 10, lines 24-34, which teaches that the area surrounding the wells and electrodes is hydrophobic so as to contain the liquid. Also see page 14, lines 3-5, which teaches using surface tension to confine liquid, and page 15, lines 27-32, which teaches that the hydrophobic substrate surface will confine liquid administered by pipette.); and

a second three-dimensional, thin film well patterned at the upper surface of the substrate wherein the second well is patterned outside and concentric to the first well wherein the second well is capable of receiving and retaining a second quantity of liquid at the desired site through surface tension (note the outer concentric electrodes in Figures 2, 7(b), 12, and 13, especially note in Figures 7(b), 12, and 13 a drop only in the inner well and a drop that extends to the well

defined by the outer concentric electrode. Further note that on page 15, line 33 to page 16, line 4 Gau teaches that electrolyte and/or analyte may be caused to cover each individual electrode by controlling surface tension).

Addressing Claim 3, Gau teaches a micromachined device for receiving and retaining a plurality of separate liquid droplets at desired sites (the abstract), the device comprising

a substrate having an upper surface (substrate, not labeled, upon which the electrodes are located shown in Figures 2, 7(b), 12, and 13, on pages 36, 38, 8/19, and 8/19, respectively);

an array of three-dimensional, thin film wells patterned at the upper surface of the substrate (the abstract; Figures 1 and 2 on page 53 and Figure 23 on page 14/19) wherein each of the wells is capable of receiving and retaining a known quantity of liquid at one of the desired sites through surface tension (a well is shown in Figures 2, 7(b), 12, and 13, on pages 36, 38, 8/19, and 8/19, respectively. Note that the inner electrode of the concentric electrodes also act as a well. That the wells are capable of retaining a known quantity of liquid at the desired site through surface tension is implied by page 10, lines 24-34, which teaches that the area surrounding the wells and electrodes is hydrophobic so as to contain the liquid. Also see page 14, lines 3-5, which teaches using surface tension to confine liquid, and page 15, lines 27-32, which teaches that the hydrophobic substrate surface will confine liquid administered by pipette.).

Addressing Claim 4, Gau teaches a micromachined device for receiving and retaining at least one liquid droplet at a desired site (the abstract), the device comprising

a substrate having an upper surface (substrate, not labeled, upon which the electrodes are located shown in Figures 2, 7(b), 12, and 13, on pages 36, 38, 8/19, and 8/19, respectively);

a first array of three-dimensional, thin film wells patterned at the upper surface of the substrate wherein the first well is capable of receiving and retaining a known quantity of liquid at the desired site through surface tension (a well is shown in Figures 2, 7(b), 12, and 13, on pages 36, 38, 8/19, and 8/19, respectively. Note that the inner electrode of the concentric electrodes also act as a well. That the wells are capable of retaining a known quantity of liquid at the desired site through surface tension is implied by page 10, lines 24-34, which teaches that the area surrounding the wells and electrodes is hydrophobic so as to contain the liquid. Also see page 14, lines 3-5, which teaches using surface tension to confine liquid, and page 15, lines 27-32, which teaches that the hydrophobic substrate surface will confine liquid administered by pipette.); and

a second array of three-dimensional, thin film well patterned at the upper surface of the substrate wherein well of the second array of wells is patterned outside and concentric to one well of the first array of wells to receive and retain a second quantity of liquid at the desired site through surface tension (note the outer concentric electrodes in Figures 2, 7(b), 12, and 13, especially note in Figures 7(b), 12, and 13 a drop only in the inner well and a drop that extends to the outer well defined by the outer concentric electrode. Further note that on page 15, line 33 to page 16, line 4 Gau teaches electrolyte and/or analyte may be caused to cover each individual electrode by controlling surface tension.).

Addressing Claim 5, wells in the form of rings are shown in Figures 2, 7(b), 12, and 13.

Addressing Claim 6, that the device is a microsensor and each of the desired sites is a sensing site may be seen from the abstract.

Addressing Claim 7, that the microsensor is a solid –state, liquid chemical sensor may be seen from the abstract.

Addressing Claim 11, page 16, line 23 – page 17, line 9 describe how the wells are made by photo patterning.

Addressing Claims 17 and 18, Gau teaches a silicon wafer in page 16, lines 23-26.

Addressing Claim 19, Gau teaches patterning wells on an oxide layer, which serves electrical insulation, above the silicon wafer (page 16, lines 33-35).

Addressing Claim 21, Gau teaches a potentiometric embodiment in page 2, line. 24 to page 3, line 3. That each desired site is a sensing site is disclosed in the abstract.

Addressing Claim 22, having the sensor configured as an integrated ion sensor wherein each site is a sensing site is disclosed in the abstract.

Addressing Claim 24, Gau teaches a method of making a micromachined device which is capable of receiving and retaining at least one liquid droplet (the abstract; Figures 2, 7(b), 12, and 13, on pages 36, 38, 8/19, and 8/19, respectively) comprising

providing a substrate having a layer of radiation sensitive material formed thereon (page 16, lines 23 to page 17, line 1);

patterning at least one three-dimensional, thin film well from the layer of material wherein the at least one wells is capable of receiving and retaining a known quantity of liquid through surface tension (page 16, lines 23-28; page 16, line 36 to page 17, line 9; and Figures 12, and 13, on pages 36, 38, 8/19, and 8/19, respectively. That the well is capable of retaining a known quantity of liquid at the desired site through surface tension is implied by page 10, lines 24-34, which teaches that the area surrounding the wells and electrodes is hydrophobic so as to contain the liquid. Also see page 14, lines 3-5, which teaches using surface tension to confine liquid, and page 15, lines 27-32, which teaches that the hydrophobic substrate surface will confine liquid administered by

pipette).

Addressing Claim 25, as seen from Figures 12 and 17-19 a three-dimensional thin film well is patterned concentric to the at leas tone well at the same time as patterning the at least one well.

Addressing Claim 26, since the layer is made with photo-resist it is photo-patternable (page 16, line 36 to page 17, line 9).

Addressing Claim 38, assuming that "an organic electronic device" is a device capable of detecting organic molecules, Gau's device is an organic electronic device because, as seen from the abstract, it is capable of detecting DNA, RNA, or protein.

12. Claims 1, 3, 5, 10, 20, and 38 are rejected under 35 U.S.C. 102(b) as being anticipated by Inoue et al. (US 5,955,352).

Addressing Claim 1, Inoue et al. teach a micromachined device for receiving and retaining a liquid droplet at a desired site (the abstract; Figures 1-7; and col. 8, ll. 25-48), the device comprising

a substrate (element 1 in the figures) having an upper surface; and

a three-dimensional, thin film well patterned at the upper surface of the substrate wherein the well is capable of receiving and retaining a known quantity of liquid at the desired site through surface tension (element 11 in Figures 4-7 corresponds to the claimed thin film well. Note that retaining liquid as claimed is taught by Figure 6, which shows a drop of liquid retained in a sample holding portion and col. 5, ll. 45-62 and col. 6, ll. 25-36, which teaches that the upper surface of the substrate is hydrophobic expect for the sample-holding portions so that a liquid drop may be retained by surface tension. Retaining a known quantity of sample is taught in col. 7, ll. 1-7).

Addressing Claim 3, Inoue et al. teach a micromachined device for receiving and retaining a plurality of separate liquid droplets at desired sites (the abstract), the device comprising

a substrate having an upper surface (the abstract; Figures 1-7; and col. 8, ll. 25-48);

an array of three-dimensional, thin film wells patterned at the upper surface of the substrate (Figures 1-3) wherein each of the wells is capable of receiving and retaining a known quantity of liquid at one of the desired sites through surface tension (element 11 in Figures 4-7 corresponds to the claimed thin film well. Note that retaining liquid as claimed is taught by Figure 6, which shows a drop of liquid retained in a sample holding portion and col. 5, ll. 45-62 and col. 6, ll. 25-36, which teaches that the upper surface of the substrate is hydrophobic expect for the sample-holding portions so that a liquid drop may be retained by surface tension. Retaining a known quantity of sample is taught in col. 7, ll. 1-7.)

Addressing Claim 5, wells in the form of rings are shown in Figures 1-7.

Addressing Claim 10, that the device is a biomedical test plate is implied by col. 2, ll. 16-26, which teaches using the device for performing clinical tests or microbiological tests.

Addressing Claim 20, Inoue et al. disclose various materials other than a semiconductor material from which the substrate may be made, such as plastic, papers, or metals (col. 5, ln. 64 – col. 6, ln. 8).

Addressing Claim 38, assuming that "an organic electronic device" is a device capable of detecting organic molecules, the device of Inoue et al. is an organic electronic device because, as seen from the abstract, it is for performing microbiological tests.

13. Claims 1, 3, 5-7, 9, 20, 21, and 38 are rejected under 35 U.S.C. 102(b) as being anticipated by Gratzl et al. (WO 98/13675 A1).

Addressing Claim 1, Gratzl et al. teach a micromachined device for receiving and retaining a liquid droplet at a desired site (the abstract), the device comprising

a substrate (element 12 in Figures 1 and 6) having an upper surface; and

a three-dimensional, thin film well patterned at the upper surface of the substrate wherein the well is capable of receiving and retaining a known quantity of liquid at the desired site through surface tension (element 18 in Figures 1 and 6 and page 11, line 26 to page 12, line 24).

Addressing Claim 3, Gratzl et al. teach a micromachined device for receiving and retaining a liquid droplet at desired sites (the abstract), the device comprising

a substrate (element 12 in Figures 1 and 6) having an upper surface; and

an array of three-dimensional, thin film wells patterned at the upper surface of the substrate (an array of wells is implied or suggested by page 22, lines 3-21 and Figure 8, which teaches having more that one well site wherein each of the wells is capable of receiving and retaining a known quantity of liquid at one of the desired sites through surface tension (element 18 in Figures 1 and 6 and page 11, line 26 to page 12, line 24).

Addressing Claim 5, that that wells are in the form of rings are shown in Figures 3, 5, and 8.

Addressing Claim 6, that the device is a microsensor and each of the desired sites is a sensing site may be seen from the abstract.

Addressing Claim 7, that the microsensor is a solid –state, liquid chemical sensor may be seen from the abstract.

Addressing Claim 9, embodiments in which the microsensor is an optical sensor are disclosed on page 14, line 1 – page 16, line 2 and page 17, lines 28-32.

Addressing Claim 20, Gratzl et al. teach a Pyrex substrate (page 12, lines 9-11).

Addressing Claim 21, Gratzl et al. teach using the device for potentiometric sensing in page 18, lines 25-28.

Addressing Claim 38, assuming that "an organic electronic device" is a device capable of making measuemtns on organic samples, the device of Gratzl et al. is an organic electronic device because, they disclose using the device to adjust pH in physiological samples (page 18, ll. 12-23 and page 19, ll. 21-34).

Allowable Subject Matter

14. Claims 12-16 and 23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

15. Claims 8 and 12-16 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

16. The following is a statement of reasons for the indication of allowable subject matter:

a) Claim 8: the microsensor of Gau is configured for especially configured for liquid samples. The wells, electrodes, and surface of the substrate are designed so that a sample droplet is retained on a confined area by surface tension. Expected samples are ionic molecules and macromoles such as DNA and RNA. The microsensor of Graztl is also especially configured for liquid samples. A sample droplet is retained on a confined area by surface tension. Gas is used to stir and sample droplets (page 22, lines 3-10), but gas is not disclosed as being analyzed;

b) Claim 12: to the examiner's best knowledge PR 5214, the photo resist used by Gau, is a positive photo-patternable material;

c) Claims 13 and 15 depend from allowable Claim 12;

d) Claim 14 depends from Claim allowable 13;

e) Claim 16 depends from Claim allowable 15; and

f) Claim 23: no side wall having an outside corner with a small radius as claimed appears to b e disclosed in Gau, Inoue et al., and Gratzl et al. These references appear to only disclose a sharp-edged outside corner.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALEX NOGUEROLA whose telephone number is (703) 305-5686. The examiner can normally be reached on M-F 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, NAM NGUYEN can be reached on (703) 308-3322. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Alex Noguerola
February 6, 2003